(12) UK Patent Application (19) GB (11) 2 237 224 (13) A

(43) Date of A publication 01.05.1991

(21) Application No 9018314.6

(22) Date of filing 21.08.1990

(30) Priority data
(31) 8921145 (32) 19.09.1989 (33) GB

(71) Applicant
Malcolm Thomas Craig
32 Central Avenue, Pinner, Middlesex, HA5 5BS, United Kingdom

(72) Inventor
Malcolm Thomas Craig

(74) Agent and/or Address for Service
J Y & G W Johnson
Furnival House, 14-18 High Holborn, London, WC1V 6DE, United Kingdom

(51) INT CL[5]
B21D 51/10, A23G 3/28

(52) UK CL (Edition K)
B3A A113
A2A A2

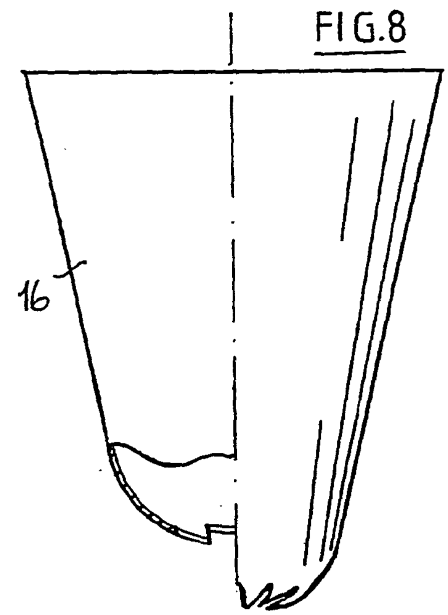
(56) Documents cited
None

(58) Field of search
UK CL (Edition K) **A2A, B3A**
INT CL[5] **A23G, B21D**

(54) **Improved sugarcraft article and method**

(57) A seamless icing tube nozzle 16 is made by deep drawing a conical shape from sheet metal, e.g. stainless steel, and removing the closed end, e.g. by a punch and die. The punched out end may be further formed. The cone semi-angle is between 10° & 15° and the nozzle is preferably provided with a double-thickness bead at its open wide end, e.g. by press form swaging.

FIG.8



GB 2 237 224 A

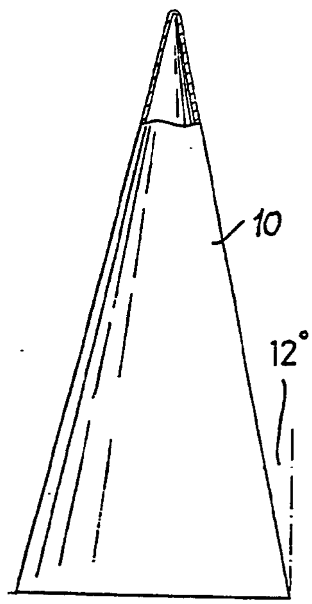


FIG.1

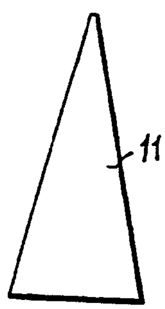


FIG.2

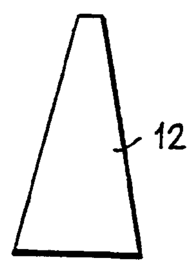


FIG.3

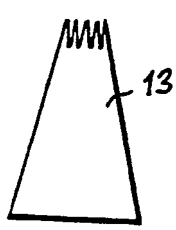


FIG.4

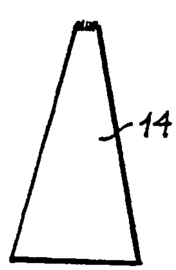


FIG.5

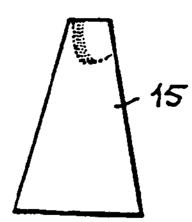


FIG.6

FIG.7

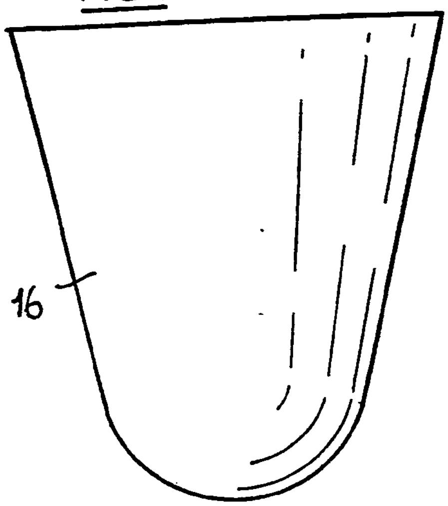


FIG.8

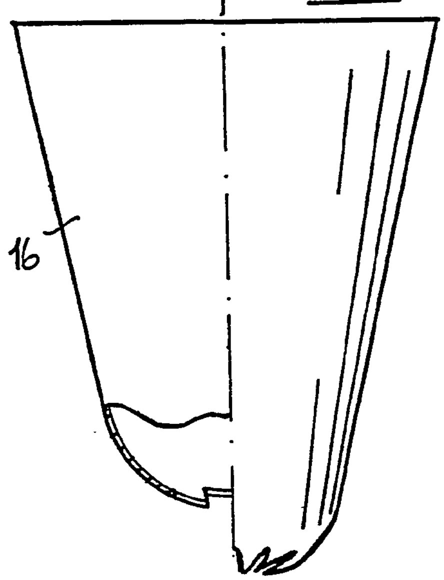


FIG.9

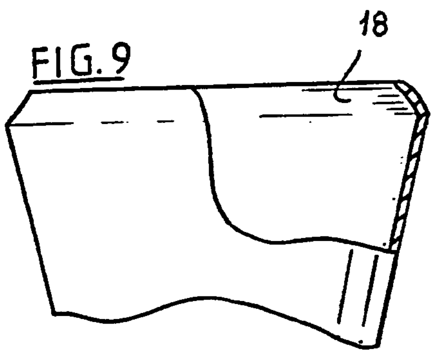


FIG.10

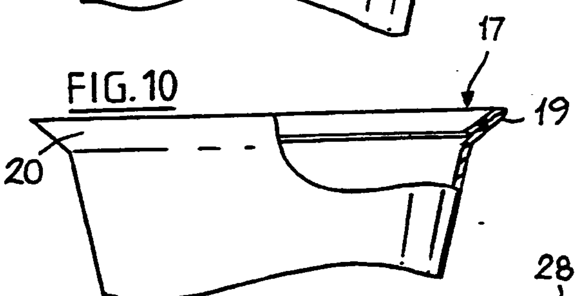


FIG.11

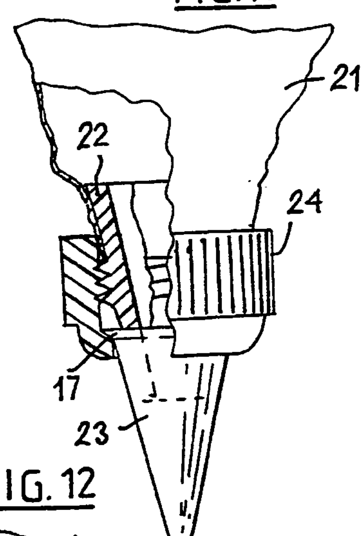
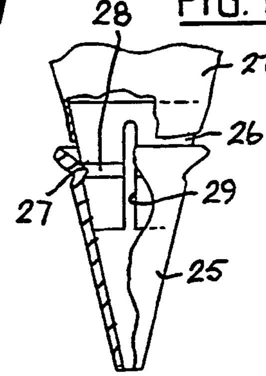


FIG.12



IMPROVED SUGARCRAFT ARTICLE AND METHOD

This invention relates to a novel method of manufacturing icing tubes (sometimes referred to as piping nozzles) and to icing tubes made by the method.

The piping of viscous paste material to form decoration on articles has been known for decades and has developed to the status of an art form in the case of the decoration of cakes using sugar icing. A wide range of different shaped icing tubes are available, the sizing and cross-sectional shape of the outlet or nozzle of a tube determining the form of decoration that can be produced therewith. Scores of different shapes and sizes of icing tubes are commercially available, some being moulded in plastics materials others made of metal. The better quality icing tubes are formed from brass, or nickel silver by a stamping, rolling and seaming process.

According to one aspect of this invention, an icing tube is produced by deep drawing a conical shape from sheet metal and removing the closed end to leave a tube of tapering cross-section and required outlet shape.

Preferably the feedstock used for the deep drawing is stainless steel sheet of between 0.005 and 0.010 inch (0.127 to 0.254 mm) thickness. 0.007 inch (0.178 mm) stainless steel sheet is particularly suitable. A semi-angle of between 10° and 15° for the deep drawn cone would appear to be suitable. I prefer a semi-angle of between 11° and 12.5°, suitably 12°. A 12° semi-angle has been shown to permit a large variety of tip shapes/nozzle sizes to be produced from the same size of deep drawn conical blank, the lengths of the tubes (measured in the axial direction) then decreasing as the size of the tip nozzle increases.

Using stainless steel cones without any seam as the

basis for the icing tubes allows the open wide end to be r inforced by a rolling or forming operation. A seamless construction also permits the final tubes to be boiled in water (e.g. to sterilise and/or to remove hardened icing sugar from the nozzle) without risk of damage due to differential expansions (damage being a possibility with brazed or soldered rolled cones or plated metal starting materials) or discolouration (discolouration being possible with brass or nickel silver).

The deep drawing is effected in a plurality of successive stages and produces a cone with a closed end. The radius of the closed end is open to considerable variation, more stages generally being necessary the smaller the final end radius achieved. For a closed end of radius 0.24 inch (6 mm) some 7 stages will typically be required but for an internal radius 0.005 inch (0.127 mm) ten or more stages may be required.

To draw 0.007 inch (0.178 mm) thick stainless steel sheet down to a closed cone of 12° semi-angle, a length of around 1.5 inch (38.1 mm) and with virtually a sharp point requires twelve in line and progressive drawing stages.

The removal of the closed end of each deep drawn cone can be undertaken by matched sets of punches and dies which precisely locate each cone and remove some or all of the cone tip leaving the required shaped and sized nozzle opening. With the larger radii closed ends, the end punching operation can also be used to shape the material left around the nozzle opening into the lower narrow end of the conical tube so that a continuous conical end terminating in the nozzle opening is left.

To strengthen the op n upper end of ach tube it may be desirable to fold over an end region of the tube and I prefer to achieve this by press-form swaging the metal. A particularly suitable method of providing a strengthening

bead around the wide open end of each tube is to swage the drawn metal inwards to form a lip and then press-form the lip outwards so that it is bent back to form a bead lying at a greater semi-angle than the rest of the outside of the tube. The inward swaging and outward forming can be accomplished as successive operations of a single swaging and press-forming tool.

The provision of an outwardly formed bead on the open upper end of each tube not only provides additional strength, resisting deformation during packaging, transport and use of the tube, but also provides an improved location for a tube in a screw-threaded adaptor commonly used with a Savoy bag in which the paste material to be piped is contained.

A further aspect of this invention relates tc an icing tube made by the aforedescribed method.

The invention will now be further described by way of example with reference to the accompanying drawings, in which:-

Figure 1 shows a partially sectioned deep drawn conical precursor of an icing tube before the required nozzle opening has been formed therein,

Figures 2 to 6 are side elevations of five different icing tubes formed from the precursor of Figure 1,

Figure 7 shows a deep drawn precursor of an icing tube with a larger radius closed end,

Figure 8 shows, on the left of the centre line how the tube end of Figure 7 is punched to provide the nozzle opening and on the right of the centre line how metal surrounding the punched opening is subsequently deformed into conical form,

Figure 9 shows a first stage in the production of a strengthening bead at the open top of a tube, and

Figure 10 shows the bead completed by a folding-over operation.

The 24° stainless steel hollow conical deep drawn precursor 10 of Figure 1 has an outer tip radius of 0.31 mm and an inner tip radius of 0.13 mm. The axial length of the precursor 10 is 39.7 mm and the maximum diameter is 17.5 mm.

Using opposed male and female punches the closed tip of the precursor 10 is cut off in any of a wide variety of different nozzle sizes and shapes. Cutting a circular hole will give a "writing" tube and one such is shown at 11 in Figure 2 (with a nozzle diameter of 0.38 mm) and at 12 in Figure 3 (with a nozzle diameter of 2.54 mm). The axial length of the tube 11 is less than that of the precursor 10 but is greater than that of the tube 12 since a larger diameter nozzle opening is required in the tube 12 than in the tube 11.

Figure 4 is representative of one of many different "star" tubes 13 that can be produced (this one being an 8-pointed star), and Figure 5 is representative of many different "rope" tubes 14 that can be produced.

Figure 6 shows a "petal" tube 15 which is deformed in directions normal to the axis of the precursor cone in the vicinity of the nozzle opening.

The forming of the nozzle opening at the tip of the precursor cone 10 can result in a deformation of the cone material around the opening as well as a removal of material to form the opening, and one example of this is shown in Figures 7 and 8.

The closed end of the precursor 16 in Figure 7 has a radius of some 6 mm but the precursor is otherwise identical to that shown in Figure 1. However, fewer drawing stages are needed to produce the precursor 16 of Figure 7 thus resulting in a lower production cost.

The two-stage formation of the nozzle opening in the precursor 16 is illustrated in Figure 8, the section to the left of the centre line showing the result of a punching operation and the section to the right showing a subsequent forming operation to create a continuous conical shape to the tube wall. The sizing change in the nozzle opening caused by the second stage forming operation can be allowed for in the production of the opening formed after the first stage. Punching an opening in the larger radius end shown in Figure 7 can be an easier operation, particularly in the case of non-circular nozzle openings, than punching an opening in the sharper end of the precursor 10 of Figure 1.

Figures 9 and 10 illustrate a preferred method of providing a strengthening bead 17 on the wide open end of a tube. In the first stage of bead production shown in Figure 9 a narrow lip 18 (e.g. some 1 mm wide) is turned inwardly by press-form swaging. As shown in Figure 10 the lip 18 is bent back onto the inside of the tube to provide a narrow double thickness rim 19 on the top of the tube, this rim simultaneously being deformed outwardly to provide a narrow frusto-conical collar 20 around the top of the tube which has a larger semi-angle (e.g. 45° instead of 12°) than the rest of the tube. The provision of a collar 20 as shown in Figure 10 strengthens the tube against deformation and also provides a bead which can be used to hold the icing tube onto the outl t end of a paste-dispensing extruder (e.g. a Savoy bag). It will be appreciated that the absence of any longitudinal seam or join in the drawn precursor tubes makes the provision of a rolled-over strengthening bead a particularly attractive way of enhanc-

ing the usefulness of the icing tubes.

Figure 11 shows the lower end of a generally conical fabric bag 21 in which a hollow frusto-conical outlet 22 is retained, the icing tube 23 being held in place over the outlet 22 by a screw-threaded ring 24 which bears on the bead 17.

Figure 12 shows a further method of removably securing a nozzle tube 25 on an outlet 26 for paste. In this case a bead 27 on the tube 25 locates in a groove 28, the outlet having a pair of longitudinal splits 29 which cause the outlet 26 to expand slightly under the pressure of the paste as dispensing proceeds through the nozzle tube 25. The expansion of the outlet 26 is prevented by the containing tube 25 causing the engagement of the bead 27 in the groove 28 to lock the nozzle tube 25 on the outlet 26. When dispensing pressure is relaxed (as will occur when the time comes to exchange one nozzle tube 25 for another) the last-used tube 25 can be pulled off the outlet 26 and the new tube slid over the outlet to itself become locked in place by bead/groove engagement.

CLAIMS

1. An icing tube produced by deep drawing a conical shape from sheet metal and removing the closed end to leave a tube of tapering cross-section and required outlet shape.

2. An icing tube as claimed in claim 1 in which the open wide end of the tube is reinforced by a double thickness strengthening bead.

3. An icing tube as claimed in claim 1 or claim 2, in which the semi-angle of the conical shape is between 10° and 15°.

4. An icing tube as claimed in claim 3, in which the semi-angle is between 11° and 12.5°.

5. An icing tube as claimed in any preceding claim in which the closed end removed has a radius of not more than 6 mm.

6. An icing tube as claimed in claim 2 or any claim dependent thereon, in which the bead is formed by press-form swaging the sheet metal to leave the bead with a frusto-conical shape of greater semi-angle than the rest of the conical shape of the tube.

7. An icing tube comprising a drawn seamless metallic conical member having a nozzle opening at the narrow end and a double-thickness strengthening bead at the wide open end.

8. An icing tube as claimed in claim 7, in which the bead is of frusto-conical shape of semi-angle greater than the semi-angle of the conical member.

9. An icing tube as claimed in claim 7 or claim 8,

in which the semi-angle of the conical member is of the order of 12°.

10. An icing tube as claimed in claim 9, in which the semi-angle of the bead is of the order of 45°.

11. An icing tube as claimed in any one of claims 7 to 10, in which the conical member is drawn from stainless steel.

12. A method of making an icing tube substantially as hereinbefore described with reference to Figures 1 to 6 or Figures 7 and 8 of the accompanying drawings.

13. An icing tube substantially as hereinbefore described with reference to Figures 2 to 6 of the accompanying drawings.

14. An icing tube according to claim 13 when modified by the bead shown in Figure 10 of the accompanying drawings.

Published 1991 at The Patent Office, State House, 66/71 High Holborn, London WC1R 4TP. Further copies may be obtained from
i, Nine Mile Point, Cwmfelinfach, Cross Keys, Newport, NP1 7HZ. Printed by Multiplex techniques ltd, St Mary Cray, Kent.